

NOTES ON GEOGRAPHIC DISTRIBUTION

Insecta, Ephemeroptera: Range extensions and new records for Ontario and Canada

W. Patrick McCafferty¹

Luke M. Jacobus²

Jeffrey M. Webb³

Michael D. Meyer⁴

¹ *Purdue University, Department of Entomology.*

West Lafayette, Indiana 47907 USA. E-mail: mccaffer@purdue.edu

² *Indiana University, Department of Biology.*

Bloomington, Indiana 47405 USA.

³ *La Trobe University, Albury/Wodonga, Department of Environmental Management and Ecology.*
Campus, P. O. Box 821, Wodonga, Victoria, Australia 3689.

⁴ *Christopher Newport University, Department of Biology, Chemistry, and Environmental Science.*
University Place, Newport, Virginia 23606 USA.

The last comprehensive review of the mayfly (Ephemeroptera) fauna of Ontario, Canada was that of McCafferty and Randolph (1998), wherein 165 species were listed for the province, including documentation of several new records. Certain deletions from the list have become necessary since that time as follows: two species, *Isonychia sicca* and *Neoephemera bicolor*, must be deleted because the report of *I. sicca* had been based on a misidentification of *I. bicolor* by F. Ide, as discussed by Kondratieff and Voshell (1984), and *N. bicolor* had been collected historically from Quebec, not Ontario, by G. Walley, as discussed by Jacobus and McCafferty (2002).

Other species that must be removed from the Ontario list include *Dentatella bartoni* (Allen, 1977) because it was synonymized with *D. coxalis* (McDunnough, 1926), which had already been known from Ontario (McCafferty et al. 2003); *Ephemerella rotunda*, because it was synonymized with *E. invaria*, which had already been known from Ontario (Jacobus and McCafferty 2003); *Procloeon convexum* because it was synonymized with *Centropitulum album*, which had already been known from Ontario (Wiersema and McCafferty 2004); and *S. sordida* because it was synonymized with *Serratella serrata*, which had already been known from Ontario (Jacobus and McCafferty 2003). Another deletion that could be considered is *Maccaffertium*

flaveolum, because it is a *nomen dubium* (McCafferty and Bae 1992). Other synonyms (and generic recombinations) made since 1998 that involve species previously reported from Ontario, do not affect the actual species or numbers recognized from Ontario and are not reviewed here.

Along with deletions, there are also some recent additions to the list of Ontario mayflies based on published reports since McCafferty and Randolph (1998). These include *Baetisca rubescens* reported by Jacobus and McCafferty (2001); *Iswaeon anoka* reported by McCafferty et al. (2005); *Procloeon vicinum* reported by Jacobus and McCafferty (2001); *Pseudocentropitiloides usa*, reported by Randolph et al. (2002); *Pseudocloeon ephippiatum* reported by Randolph et al. (2002); *Brachycercus ojibwe*, reported by Sun and McCafferty (2008); and *Sparbarus maculatus*, reported by Sun and McCafferty (2008).

In consideration of the seven significant deletions and the seven significant additions mentioned above, there were 165 recognizable, valid species of mayflies known from Ontario previous to the present publication. We are able to augment that number considerably based on a recent study involving our identification of the entire Ontario Ephemeroptera collection held at the Royal Ontario Museum in Toronto, Ontario, Canada.

NOTES ON GEOGRAPHIC DISTRIBUTION

Among the 3,371 records that we were able to generate from the collection of approximately 30,000 specimens, there were new records of 23 species from Ontario.

These new records are presented below and bring the known number of Ephemeroptera species in Ontario to 188. In addition, the eight species below marked with asterisks represent new Canadian country records, bringing the number of known species in Canada to 326. With the addition of these species, it can be seen that Ontario includes about 34% of the known North American faunal diversity, and about 58% of the known Canadian faunal diversity. Records are given below in alphabetical order by family, genus, and species. Records refer to larvae, unless otherwise indicated as alate stages.

Ameletidae

**Ameletus cryptostimulus*. Algoma District, Olsen Township, Quintet Creek (47°05.5' N, 84°15.5' W), Ministry of Natural Resources Lot # 4485-010, 17 September 1985.

Ameletus lineatus. Durham County, Kendal, cold fast stream, 31 May 1966.

Baetidae

Centroptilum conturbatum. Simcoe County, Mad River, 6 July 1928 (larvae and adults).

Cloeon dipterum. Northumberland County, Hope Township, Ganaraska River (44°03.4' N, 78°21.5' W), Ministry of Natural Resources Lot # 7379-007, 25 July 1979.

Procloeon ingens. United Counties of Stormont, Dundas and Glengarry, Finch Township, South Nation River (45°11.6' N, 75°10.1' W), Ministry of Natural Resources Lot # 6274-001, 3 July 1974, and Matilda Township, Black Creek, (44°58.9' N, 75°25.7' W), Ministry of Natural Resources Lot # 6274-004, 10 June 1974.

Procloeon quaesitum. Victoria County, Eldon Township, Pearn's Creek (44°27.8' N, 78°52.5' W), Ministry of Natural Resources Lot # 7376-269, 8 June 1976.

Procloeon rivulare. Algoma District, Tarentorus Township, Root River (46°36.2' N, 84°16.6' W),

Ministry of Natural Resources Lot # 4476-268, 26 June 1976, and Tilley Township, Chippewa River (47°01.3' N, 84°16.3' W), Ministry of Natural Resources Lot # 4485-002, 26 June 1985; Durham Regional Municipality, Newcastle Township Municipality, Bowmanville Creek, (44°00.7' N, 78°47' W), Ministry of Natural Resources Lot # 7382-001, 9 August 1982.

Caenidae

Brachycercus harrisella. Cochrane District, Tucker Township, Groundhog River (49°35.5' N, 81°57.3' W), Ministry of Natural Resources Lot # 3585-001, 11 July 1985.

Caenis tardata. Algoma District, Tilley Township, Chippewa River (47°04.2' N, 84°15.7' W), Ministry of Natural Resources Lot # 4485-002, 29 July 1985; Elgin County, Southwold Township, Kettle Creek (42°41.5' N, 81°13.5' W), Ministry of Natural Resources Lot # 8173-192, 19 August 1973; Oxford County, South Easthope Township, NL, Thames River (43°20.3' N, 80°51.7' W), Ministry of Natural Resources Lot # 8174-001, 17 July 1974.

Ephemerellidae

Dannella lita. Haldimand-Norfolk Regional Municipality, Delhi Township Municipality, NL, Stoney Creek (42°49.2' N, 80°29.9' W), Ministry of Natural Resources Lot # 8473-002, 6 June 1973, and Big Creek (42°46.9' N, 80°29.9' W), Ministry of Natural Resources Lot # 8483-001, 5 July 1983, and Norfolk Township, Big Creek, (42°43.0' N, 80°31.9' W), Ministry of Natural Resources Lot # 8483-001, 5 July 1983.

Ephemeridae

**Ephemera blanda*. Bruce County, Greenock Township, Teeswater River (44°58.5' N, 81°41.6' W), Ministry of Natural Resources Lot 8572-001, 18 August 1972; Cambridge, South Saugeen River, Mount Forest (43°58.5' N, 80°43.8' W), 8 August 1977.

Heptageniidae

Epeorus fragilis. Durham County, Kendal, cold fast stream, 31 May 1966.

NOTES ON GEOGRAPHIC DISTRIBUTION

Heptagenia elegantula. Grey County, Collingwood Township, at 2nd C, 18 June 1950.

**Maccaffertium meririvulanum*. Haldimand-Norfolk Regional Municipality, Delhi Township Municipality, Big Creek (42°56.1' N, 80°27.8' W), Ministry of Natural Resources Lot # 8474-010, 28 August 1974; Macan County, Nantahala National Forest, stream near hairpin turn on road to Wayah Bald, 18 May 1991.

Rhithrogena undulata. Algoma District, Olsen Township, McGovern Creek (46°04.3' N, 84°16.8' W), Ministry of Natural Resources Lot # 4485-013, 16 September 1985, and Brule Township, MacDonald Creek (46°01.9' N, 84°15.6' W), Ministry of Natural Resources Lot # 4485-011, 12 September 1985.

Stenacron gildersleevei. Cambridge, Credit River, Erin Branch, Station 1d, 31 May 1977.

Isonychiidae

**Isonychia obscura*. Nipissing District, Mattawa Township, NL, Boom Creek (46°18.5' N, 78°43.3' W), Ministry of Natural Resources Lot # 4374-233, 4 July 1974.

**Isonychia sayi*. Cochrane District, Strachan Township, Groundhog River (48°34.8' N, 82°11.3' W), Ministry of Natural Resources Lot # 3585-001, 13 June 1985; Grey County, Sarawak Township, Indian Creek (44°37.9' N, 80°57.2' W), Ministry of Natural Resources Lot # 8374-230, 26 June 1974.

Acknowledgments

We thank D. Sutherland (Ontario Ministry of Natural Resources) and B. Hubley (Royal Ontario Museum) for making collections available to us; and also thank A. Provonsha and L. Sun (Purdue University) for aiding in caenid species identifications.

Literature cited

Jacobus, L. M. and W. P. McCafferty. 2001. Additions to the Canadian Ephemeroptera. *Journal of the New York Entomological Society* 109: 367-371.
Jacobus, L. M. and W. P. McCafferty. 2002. Analysis of some historically unfamiliar Canadian mayflies (Ephemeroptera). *The Canadian Entomologist* 134: 141-155.
Jacobus, L. M. and W. P. McCafferty. 2003. Revisionary contribution to the North American

Leptophlebiidae

**Leptophlebia bradleyi*. Cochrane District, Unorganized Township, Harricanaw River, at ONR Goose Camp (51°06.1' N, 79°42.2' W), Ministry of Natural Resources Lot #3776-002, 15 June 1976.

**Paraleptophlebia assimilis*. Halton County, Milton Pond, 22 June 1972; Muskoka District, Baysville, Echo Lake, Station XII, 24 July 1966.

Metretopodidae

Siphloplecton interlineatum. Algoma District, Cedar Creek, East of Marathon on Route 17, impoundment above dam, 6 June 1971.

Potamanthidae

**Anthopotamus neglectus*. Bruce County, Saugeen Township, Saugeen River (44°19.2' N, 81°18.3' W), Ministry of Natural Resources Lot # 8374-229, 19 August 1974; Grey County, Bentinck Township, Habermehl Creek (44°08' N, 81°01' W), Ministry of Natural Resources Lot 8372-010, 16 August 1972.

Siphonuridae

Siphonurus mirus. Bruce County, Amabel Township, Clavering Creek (44°44.1' N, 81°11.1' W), Ministry of Natural Resources Lot # 8374-003, 21 June 1974.

Ephemerella and *Serratella* (Ephemeroptera: Ephemerellidae). *Journal of the New York Entomological Society* 111: 174-193.
Kondratieff, B. C. and J. R. Voshell. 1984. The North and Central American species of *Isonychia* (Ephemeroptera: Oligoneuriidae). *Transactions of the American Entomological Society* 110: 129-244.
McCafferty, W. P. and Y. J. Bae. 1992. Taxonomic status of historically confused species of

NOTES ON GEOGRAPHIC DISTRIBUTION

- Potamanthidae and Heptageniidae (Ephemeroptera). Proceedings of the Entomological Society of Washington 94: 169-171.
- McCafferty, W. P. and R. P. Randolph. 1998. Canada mayflies: a faunistic compendium. Proceedings of the Entomological Society of Ontario 129: 47-97.
- McCafferty, W. P., L. M. Jacobus, and Q. T. Wang. 2003. Phylogenetics and the reconfirmation of *Dentatella* Allen (Ephemeroptera: Ephemerellidae). Proceedings of the Entomological Society of Washington 105: 786-788.
- McCafferty, W. P., R. D. Waltz, J. M. Webb, and L. M. Jacobus. 2005. A revision of *Heterocloeon* McDunnough (Ephemeroptera: Baetidae). Journal of Insect Science 5(35): 1-11.
- Randolph, R. P., W. P. McCafferty, D. Zaranko, and J. M. Webb. 2002. New Canadian records of Baetidae (Ephemeroptera) and adjustments to North American *Cloeon*. Entomological News 113: 306-309.
- Sun, L. and W. P. McCafferty. 2008. Cladistics, classification and identification of the brachycercine mayflies (Insecta: Ephemeroptera: Caenidae). Zootaxa 1801: 1-239.
- Wiersema, N. A. and W. P. McCafferty. 2004. New synonyms and records of North American *Centroptilum* and *Procloeon* (Ephemeroptera: Baetidae). Entomological News 115: 121-128.
- Received June 2008
Accepted October 2008
Published online November 2008